

REMARKS

Claims 1 through 14 are pending in this application. Applicants acknowledge, with appreciation, the Examiner's indication that claims 2 through 7 and 10 through 12 contain allowable subject matter. Accordingly, the only remaining issue pivots about the patentability of claims 1, 8, 9, 13 and 14.

Claim 1 was rejected under 35 USC §102 for lack of novelty as evidenced by Lee et al.

In the statement of the rejection, the Examiner referred to column 4 of Lee et al.; lines 1 through 4. This rejection is traversed.

The factual determination of lack of novelty under 35 USC §102 requires the identical disclosure in a single reference of each element of a claimed invention such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Elan Pharmaceuticals, Inc. v. Mayo Foundation*, __F.3d__ 64 USPQ2d 1292 (Fed. Cir. 2002); *Crown Operations International Ltd. v. Solutia Inc.* 289 F.3d 1367, 62 USPQ2d 1917 (Fed. Cir. 2002). Moreover, in imposing a rejection under 35 USC §102, the Examiner is charged with the initial burden of specifically identifying wherein an applied reference is believed to disclose each feature of the claimed invention. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). That burden has not been discharged. Moreover, there is a fundamental difference between the claimed invention and the methodology of Lee et al.

that scotches the factual determination that Lee et al. describe a method identically corresponding to that claim.

Specifically, the claimed invention is directed to a method of manufacturing "a semiconductor device", as that term would have been understood by one having ordinary skill in the art when reasonably interpreted in light of and consistent with the written description of the specification, not to a method of bonding a semiconductor device to a heat sink. *In re Cortright*, 165 F.3d 1353, 49 USPQ2d 1464 (Fed. Cir. 1999); *In re Morris*, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997); *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

At any rate, the first manipulative step of the claimed method requires "forming a wafer containing inlaid copper (Cu) or a Cu alloy." It is not apparent and the Examiner has not pointed out wherein Lee et al. disclose or suggest forming a wafer containing **inlaid copper**.

The Examiner points to column 4 of Lee et al, lines 1 through 4, wherein it is disclosed that the surface of a heat sink which has been oxidized is treated with a laser beam after bonding substrate 215 thereto (Fig. 8). That is **not "a wafer containing inlaid copper."** Again, the Examiner has not identified wherein Lee et al. discloses a method comprising, inter alia, "**forming a wafer containing inlaid copper**" as in independent claim 1.

The above argued differences in manipulative steps between the claimed method and the methodology of Lee et al. scotch the factual determination that Lee et al. describe a method identically corresponding to that claim. *Minnesota Mining & Manufacturing Co., v. Johnson & Johnson Orthopaedics Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed.

Cir. 1992); *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 230 USPQ 81 (*Fed. Cir. 1986*). Applicants, therefore, submit that the imposed rejection of claim 1 under 35 USC §102 for lack of novelty as evidenced by Lee et al. is not factually viable and, hence, solicit withdrawal thereof.

Claims 8, 9, 13 and 14 were rejected under 35 USC §103 for obviousness predicated upon Lee et al.

In the statement of rejection, the Examiner asserted that the recited parameters are "well within the level of one of ordinary skill in the art." With respect to claims 13 and 14, the Examiner further asserted that the substances used in the prior art "may be the same" and, therefore, the process is "within the purview of what is described by Lee et al." (paragraph bridging pages 2 and 3 of the May 6, 2003 Office Action. This rejection is traversed.

Firstly, claims 8, 9, 13 and 14 depend from independent claim 1. Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 1 under 35 USC §102 for lack of novelty as evidenced by Lee et al. Indeed, Lee et al. neither disclose nor suggest a method comprising, inter alia, "forming a wafer containing inlaid copper" as in the claimed invention. The additional comments offered by the Examiner do not cure the argued deficiencies of Lee et al. Moreover, Applicants separately argue the patentability of claims 8, 9, 13 and 14.

In order to establish a prima facie case of obviousness under 35 USC §103, the Examiner must make a "thorough and searching" factual inquiry and, based upon that factual inquiry, explain why one having ordinary skill in the art would have been

realistically impelled to modify particular prior art, in this case the methodology of Lee et al., to arrive at the claimed invention. *In re Lee* 237 F.3d 1338, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002). That burden has not been discharged. The Examiner's "within the level of ordinary skill in the art" approach begs the issue. Specifically, the Examiner has provided no facts upon which to predicate the conclusion that one having ordinary skill in the art would have been realistically motivated to arrive at the particular parameters recited in claims 8 and 9 which were derived in the context of removing a thin native oxide film from the upper surface of inlaid copper. The objective of Lee et al. is to remove a purposefully formed oxide layer on a heat sink. Assuming, arguendo, one having ordinary skill in the art would have been motivated to achieve the objective of Lee et al., that does not mean the parameters of claims 8 and 9 would be achieved, since the parameters of claims 8 and 9 are directed to a different objective. Further, the Examiner has failed to comply with judicial requirements by identifying wherein Lee et al. disclose or suggest that the time and temperature employed are art recognized result effective variables, bearing in mind that Lee et al. do not even disclose the use of a pulsed laser light beam. *In re Rijckaert, supra; In re Yates*, 663 F.2d 1954, 211 USPQ 1149 (CCPA)1981); *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

As to claims 13 and 14, the Examiner has not even pointed out where Lee et al. disclose a wafer, let alone a wafer containing a dual damascene structure as in claim 13, or a dielectric layer having a dielectric constant less than about 3.9. Again, Lee et al. are not concerned with a damascene structure, let alone low dielectric material, but with merely removing a purposely formed oxide film from a heat sink after a wafer has been

applied thereto. The disclosed laser beam treatment has nothing to do with the formation of a dual damascene structure.

Evidence of Nonobviousness

It is well settled that the problem addressed and solved by a claimed invention must be given consideration in resolving the ultimate legal conclusion of obviousness under 35 USC §103. *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 28 USPQ2d 1333 (Fed. Cir. 1993); *Nothorn Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989); *In re Nomiya*, 509 F.2d 566, 184 USPQ 607 (CCPA 1975). As disclosed throughout the written description of the specification, the present invention addresses and solves the problem of capping layer adhesion to inlaid copper and electromigration issues (page 5 of the written description of the specification, lines 2 through 12). That problem is not even a blip on the radar screen of Lee et al. who are simply addressed to packaging issues involving a heat sink. Under such circumstances the problem addressed and solved by the claimed invention is a potent indicium of nonobviousness.

Conclusion

Based upon the foregoing, it should be apparent that a prima facie basis to deny patentability to the claimed invention has not been established for lack of the requisite factual basis and want of the requisite realistic motivation. Moreover, upon giving due consideration to the problem addressed and solved by the claimed invention attendant

Serial No.: 10/079,517


upon capping inlaid copper, the conclusion appears inescapable that one having ordinary skill in the art would **not** have found the claimed invention **as a whole** obvious within the meaning of 35 USC §103. *Jones v. Hardy*, 727 F.2d 1524, 220 USPQ 1021 (Fed. Cir. 1984). Applicants, therefore, submit that the imposed rejection of claims 8, 9, 13 and 14 under 35 USC §103 for obviousness predicated upon Lee et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

Applicants, again, acknowledge appreciation for the Examiner's indication that claims 2 through 7 and 10 through 12 contain allowable subject matter. Based upon the arguments submitted *supra*, it should be apparent that the imposed rejections have been overcome and that all claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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